R E M A R K S

New claim 21 is supported in the specification on page 19, lines 4 to 5.

New claim 22 is supported in the specification on page 24, line 19 to page 25 line 3.

The presently claimed invention concerns a method for decomposing a halogenated hydrocarbon gas comprising the steps of:

supporting a catalyst for decomposing the halogenated hydrocarbon gas on a carrier which is electrically conductive and resistant to a halogen-containing gas; and

passing the gas containing the halogenated hydrocarbon through the carrier to decompose the halogenated hydrogen gas, while heating the carrier by an electromagnetic induction heating (see applicants' claim 1).

The presently claimed invention also relates to a method for decomposing a halogenated hydrocarbon gas comprising the step of:

passing a halogenated hydrocarbon containing gas through a heating body which is electrically conductive and resistant to a halogen-containing gas to decompose the halogenated hydrocarbon gas, while heating the heating body by an electromagnetic

induction heating, wherein the heating body is made of SiC (see applicants' claim 19).

The electromagnetic induction heating in the presently claimed invention allows for (i) rapid heating and rapid cooling, thus preventing the re-synthesis of dioxins and (ii) uniform heating which prevents the occurrence of catalyst degradation (see page 7, lines 18 to 24 of the specification).

Applicants are pleased to note that claims 5 to 7, 14, 16 and 17 were deemed to be allowable by the Examiner (see the paragraph at the middle of page 3 of the Office Action entitled "Allowable Subject Matter").

Claim 19 was rejected under 35 USC 102 as being anticipated by Coulon et al. USP 5,362,468 for the reasons set forth at the middle of page 2 of the Office Action.

Claims 1 to 4, 12, 13, 15 and 18 were rejected under 35 USC 103 as being unpatentable over Coulon et al. USP 5,362,468, taken with Fookes USP 5,951,852 for the reasons set forth in the paragraph bridging pages 2 and 3 of the Office Action.

It was admitted in the Office Action that Coulon et al. do not teach that a catalyst material can be coated on solid elements.

Coulon et al. (USP 5,362,468) disclose a process for the pyrolysis of fluid effluents. Coulon et al. disclose merely providing a pyrolysis chamber containing a bed of solid elements, heating the solid elements by induction, passing the effluents through the bed of heated solid elements, removing the trapped solid pyrolysis product and discharging the solid and the gaseous pyrolysis products from the chamber. Coulon et al. disclose "heating the elements by induction to a temperature sufficient for a pyrolysis of the effluent."

In Coulon et al., a high temperature range such as 1500°C is applied to the reaction process (e.g., EXAMPLE 3, column 9, line 4, in Coulon et al.). However, the object of such heating is merely for obtaining a high temperature. From this point of view, one of the conventional heating methods in this technical field, for example, an external heating process, would be sufficient to obtain such high temperature.

Coulon et al. disclose the use of as an induction coil. Heretofore, an electromagnetic induction-heating furnace has been used within a high temperature range. Coulon et al. disclose a pyrolysis temperature of 600°C or more. The reason why in the prior art electromagnetic induction heating has been used within a high temperature range is that the in-furnace temperature rises

at a rapid rate. There thus occurs some difficulties, such as the need for a special power source such as a high frequency power source, which would result in a complex device. Furthermore, some type of a non-conductive reaction tube which is made of quartz carbon ceramics, etc., would be necessary to insure an efficient electromagnetic induction heating on the internal carrier. This is one reason that an electromagnetic induction-heating furnace has scarcely been used within a low-temperature range.

In contrast to the above, the presently claimed invention provides the following advantageous results.

The electromagnetic induction heating makes it possible to heat an electrically conductive carrier homongeneously. Such a homogeneous heating can suppress the occurrence of a hot spot. Consequently, the durability of the catalyst improves to a great extent.

When a catalyst is used, the temperature is inherently low. Additionally, the catalyst reaction area reaches merely the determined temperature. Such as situation enables the heating of the entire amount of gas. Only a small amount of calorific value is needed, which is used to heat the gas. This makes it possible

to cool the gas rapidly. This results in an effective suppression of dioxin synthesis to a great extent.

Fookes (USP 5,951,852) discloses merely a process for removal of halide from a halide compound in a solvent of hydrocarbon. More specifically, Fookes discloses merely exposing a solvent of hydrocarbon and neutralizing the resulting hydrohalic acid with a halogen halide scavenger.

In Fookes, a catalyst is introduced into a reaction container containing a solvent having a halide containing organic compound and a hydrogen scavenger. Such materials are reacted under some degree of heating; then, a halogen compound in solution might be decomposed. The cited art includes a clearly different type of reactor than the present invention.

As discussed above, the presently claimed invention, as recited in applicants' claim 1, is directed to a method for decomposing a halogenated hydrocarbon gas on a carrier which is electrically conductive and resistant to a halogen-containing gas, and passing the gas containing the halogenated hydrocarbon gas, while heating the carrier by an electromagnetic induction heating.

In contrast to the presently claimed invention, conventional catalyst decomposition methods have the disadvantage of

generating dioxins, which is caused by the following factors.

When utilizing an external heating electric heater, which is used as a heating means, it is difficult to cool the decomposed gas, owing to the radiant heat. In such situation, the decomposed gas is held at a temperature level corresponding to a dioxin re-synthesis temperature. The inventors of the present invention discovered that using an electromagnetic induction method, which is capable of performing rapid heating and rapid cooling, and uniform heating, would avoid the disadvantage of dioxin generation. Since electromagnetic induction heating is able to rapidly heat and rapidly cool, the dioxin re-synthesis temperature zone can be passed within a short time, thus avoiding the re-synthesis of dioxins.

Furthermore, the electromagnetic induction heating allows for uniform heating, so that the occurrence of catalyst degradation caused by non-uniform heating is avoided.

More importantly, using a catalyst carrier which is resistant to halogen-containing gas according to the presently claimed invention, affords the ability to perform detoxification that decomposes halogenated hydrocarbon gas for long periods of time.

The present invention results in advantageous results by using electromagnetic induction heating in a catalyst-decomposition method, compared with the cited art, as described hereinbelow.

1) In the case that flon, organic chlorine compounds and similar types of substances are decomposed, there occurs a possibility that these substances are re-generated by a so-called "de novo synthesis." Concerning such re-generation, the decomposed and generated carbon and/or soot in the exhaust gas and the halogen, exist within a temperature range of from 300°C to 500°C. In the present invention, the gas which as passed through the catalyst layer, passes through the heating portion in the apparatus. Just after being heated in the heating portion, the gas is cooled rapidly. That is why in the present invention, much less time is spent for the gas to pass through the temperature range of from 300°C to 500°C. As a result, a significant advantageous result is provided in that regeneration of dioxin can be suppressed in the present invention.

2) In the present invention, the objective gas is heated homogeneously, wherever it exists, from the outer circumference to the internal portion. Therefore, the corresponding reaction can be carried out without deviation, which results in

homogeneous heating. Such a reaction makes it possible to attain a high-efficiency decomposition reaction.

Furthermore, in the present invention, the objective gas is maintained within a low temperature range. Consequently, in the present invention, there is no need to heat the objective gas by consuming an excessive amount of heat, compared with the cited art.

As a result, the durability of the corresponding catalyst is improved to a large extent, by avoiding an inappropriate temperature, i.e., high temperature range, wherein the catalyst degrades in a short term.

The presently claimed invention discloses distinctive specific features of "on a carrier" and "through the carrier", which provide advantageous results that are not found in Coulon et al. or Fookes.

For the following reasons, it is respectfully submitted that one of ordinary skill in the art would not consider to combine Coulon et al. and Fookes.

As discussed above, Fookes discloses a process for removing halide from a halide containing organic compound in a solvent of hydrocarbon or oil. This process comprises the steps of "exposing a solvent of hydrocarbon, which is capable, in the

presence of hydrogen, of converting the halide in the halide containing organic compound to hydrohalic acid, at a pressure and at an elevated temperature...."

Fookes does not teach or suggest to use induction heating. Fookes discloses merely a process for removing halide from a halide containing organic compound in a solvent of hydrocarbon or oil. In such a process, there occurs merely exposing a solvent of hydrocarbon or oil in the presence of hydrogen and a hydrogen halide scavenger. Such process results in only neutralizing the resulting hydrohalic acid with the hydrogen halide scavenger.

The Fookes method is merely a well-known chemical reaction. In Fookes, there is no teaching or suggestion of how to decompose a halogenated hydrocarbon gas in an appropriate way to suppress dioxin synthesis.

Coulon et al. disclose merely a pyrolysis process, and Fookes disclose merely an exposing and neutralizing process.

Even assuming *arguendo* that the references are combinable, it is respectfully submitted that the results of such combination would teach away from the effectiveness of the present invention. The result of a tentatively predicted combination may be as follows:

A catalyst is introduced into some solution. The solution contains some halogen compound. The catalyst possesses an electrically conductive characteristic. In some batch type of reactor, much time is spent on applying pressure and heating. Then, the same halogen compound is decomposed.

The above discussed tentatively predicted combination would result in the following disadvantages.

It would take a long time for the batch type reactor to decompose the objective substances. It would be impossible to prevent the particles of the catalyst from being heated to the respective degree.

The existence of a liquid phase would make it difficult to heat the catalyst.

Some reaction in the liquid phase would make it absolutely impossible to avoid dioxin synthesis ("de novo synthesis" occurs in the gaseous phase).

The liquid phase needs a large amount of heat capacity. So, in order to heat it, an incredibly large amount of the catalyst would be required.

In the case of applying pressure or in the case of reducing pressure, a pressure container made of non-electromagentic

material would be needed, for example, a ceramic material. It would not be possible to produce such a pressure container in view of the production cost and the fabrication method. It may be that stainless using steel can be used to make the pressure container, but SUS makes it impossible to carry out electromagnetic induction heating.

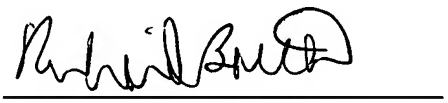
Even if the references are combined, the combination would not attain the effectiveness of the presently claimed invention, since the combination of the cited references would not result in an important feature of the present invention, namely suppressing dioxin synthesis.

It is therefore respectfully submitted that applicants' claimed invention is not anticipated and is not rendered obvious over the references, either singly or combined in the manner relied on in the Office Action, in view of the many distinctions discussed hereinabove. It is furthermore submitted that there are no teachings in the references to combine them in the manner relied on in the Office Action.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



Richard S. Barth
Reg. No. 28,180

Frishauf, Holtz, Goodman
& Chick, P.C.
767 Third Ave., 25th Floor
New York, NY 10017-2023
Tel. Nos. (212) 319-4900
(212) 319-4551/Ext. 219
Fax No.: (212) 319-5101
E-Mail Address: BARTH@FHGC-LAW.COM
RSB/ddf

Enclosure: PETITION FOR EXTENSION OF TIME